SEQUENCE LISTING

<110> Larenas, Edmund A.
Goedegebuur, Frits
Gualfetti, Peter
Mitchinson, Colin

<120> Variant Humicola grisea CBH1.1

<130> GC794-2

<140> US 10/810,277
<141> 2004-03-26

<150> US 60/459,734
<151> 2003-04-01

<160> 15

<170> FastSEQ for Windows Version 4.0

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<211> 1638
<212> DNA
<213> Humicola grisea

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accaccacca ccgccagcgc tggccccaag gctggccgct ggcagcagtg cggcggcatc 1560
ggcttcactg gcccgaccca gtgcgaggag ccctacactt gcaccaagct caacgactgg 1620
tactctcagt gcctgtaa 1638

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<211> 1323
<212> DNA
<213> Humicola grisea

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cgtacctacc tgatggacgg cgaggacaag tatcagacct tcgagctcct cggcaacgag 180
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cgccagggca acaagacctt ctacggcaag ggcatgaccg tcgacaccac caagaagatc 660
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taa 1323

<210> 3
<211> 525
<212> PRT
<213> Humicola grisea

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Ser Trp Lys Lys Cys Thr Ala Gly Gly Gln Cys Gln Thr Val Gln Ala
35 40 45
Ser Ile Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly
50 55 60
Ser Thr Asn Cys Tyr Thr Gly Asn Lys Trp Asp Thr Ser Ile Cys Thr
65 70 75 80
Asp Ala Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr
85 90 95
Thr Ser Thr Tyr Gly Ile Thr Thr Asn Gly Asp Ser Leu Ser Leu Lys
100 105 110
Phe Val Thr Lys Gly Gln His Ser Thr Asn Val Gly Ser Arg Thr Tyr
115 120 125
Leu Met Asp Gly Glu Asp Lys Tyr Gln Thr Phe Glu Leu Leu Gly Asn
130 135 140
Glu Phe Thr Phe Asp Val Asp Val Ser Asn Ile Gly Cys Gly Leu Asn
145 150 155 160
Gly Ala Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Leu Ser Arg
165 170 175
Tyr Pro Gly Asn Lys Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp
180 185 190
Ala Gln Cys Pro Arg Asp Ile Lys Phe Ile Asn Gly Glu Ala Asn Ile
195 200 205
Glu Gly Trp Thr Gly Ser Thr Asn Asp Pro Asn Ala Gly Ala Gly Arg
210 215 220
Tyr Gly Thr Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Asn Met
225 230 235 240

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Ala Thr Ala Phe Thr Pro His Pro Cys Thr Ile Ile Gly Gln Ser Arg
                245                 250                 255
Cys Glu Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn Glu Arg Tyr Ala
            260                 265                 270
Gly Val Cys Asp Pro Asp Gly Cys Asp Phe Asn Ser Tyr Arg Gln Gly
        275                 280                 285
Asn Lys Thr Phe Tyr Gly Lys Gly Met Thr Val Asp Thr Thr Lys Lys
    290                 295                 300
Ile Thr Val Val Thr Gln Phe Leu Lys Asp Ala Asn Gly Asp Leu Gly
305                 310                 315                 320
Glu Ile Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile Ile Pro Asn Ser
                325                 330                 335
Glu Ser Thr Ile Pro Gly Val Glu Gly Asn Ser Ile Thr Gln Asp Trp
            340                 345                 350
Cys Asp Arg Gln Lys Val Ala Phe Gly Asp Ile Asp Asp Phe Asn Arg
        355                 360                 365
Lys Gly Gly Met Lys Gln Met Gly Lys Ala Leu Ala Gly Pro Met Val
    370                 375                 380
Leu Val Met Ser Ile Trp Asp Asp His Ala Ser Asn Met Leu Trp Leu
385                 390                 395                 400
Asp Ser Thr Phe Pro Val Asp Ala Ala Gly Lys Pro Gly Ala Glu Arg
                405                 410                 415
Gly Ala Cys Pro Thr Thr Ser Gly Val Pro Ala Glu Val Glu Ala Glu
            420                 425                 430
Ala Pro Asn Ser Asn Val Val Phe Ser Asn Ile Arg Phe Gly Pro Ile
        435                 440                 445
Gly Ser Thr Val Ala Gly Leu Pro Gly Ala Gly Asn Gly Gly Asn Asn
    450                 455                 460
Gly Gly Asn Pro Pro Pro Pro Thr Thr Thr Thr Ser Ser Ala Pro Ala
465                 470                 475                 480
Thr Thr Thr Thr Ala Ser Ala Gly Pro Lys Ala Gly Arg Trp Gln Gln
                485                 490                 495
Cys Gly Gly Ile Gly Phe Thr Gly Pro Thr Gln Cys Glu Glu Pro Tyr
            500                 505                 510
Thr Cys Thr Lys Leu Asn Asp Trp Tyr Ser Gln Cys Leu
        515                 520                 525
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<210> 4
<211> 507
<212> PRT
<213> Humicola grisea

<400> 4

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Lys Lys Cys Thr Ala Gly Gly Gln Cys Gln Thr Val Gln Ala Ser Ile
            20                  25                  30
Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly Ser Thr
        35                  40                  45
Asn Cys Tyr Thr Gly Asn Lys Trp Asp Thr Ser Ile Cys Thr Asp Ala
    50                  55                  60
Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr Thr Ser
65                  70                  75                  80
Thr Tyr Gly Ile Thr Thr Asn Gly Asp Ser Leu Ser Leu Lys Phe Val
                85                  90                  95
Thr Lys Gly Gln His Ser Thr Asn Val Gly Ser Arg Thr Tyr Leu Met
            100                 105                 110
Asp Gly Glu Asp Lys Tyr Gln Thr Phe Glu Leu Leu Gly Asn Glu Phe
        115                 120                 125
Thr Phe Asp Val Asp Val Ser Asn Ile Gly Cys Gly Leu Asn Gly Ala
    130                 135                 140
Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Leu Ser Arg Tyr Pro
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145                 150                 155                 160
Gly Asn Lys Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ala Gln
                165                 170                 175
Cys Pro Arg Asp Ile Lys Phe Ile Asn Gly Glu Ala Asn Ile Glu Gly
            180                 185                 190
Trp Thr Gly Ser Thr Asn Asp Pro Asn Ala Gly Ala Gly Arg Tyr Gly
        195                 200                 205
Thr Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Asn Met Ala Thr
    210                 215                 220
Ala Phe Thr Pro His Pro Cys Thr Ile Ile Gly Gln Ser Arg Cys Glu
225                 230                 235                 240
Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn Glu Arg Tyr Ala Gly Val
                245                 250                 255
Cys Asp Pro Asp Gly Cys Asp Phe Asn Ser Tyr Arg Gln Gly Asn Lys
            260                 265                 270
Thr Phe Tyr Gly Lys Gly Met Thr Val Asp Thr Thr Lys Lys Ile Thr
        275                 280                 285
Val Val Thr Gln Phe Leu Lys Asp Ala Asn Gly Asp Leu Gly Glu Ile
    290                 295                 300
Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile Ile Pro Asn Ser Glu Ser
305                 310                 315                 320
Thr Ile Pro Gly Val Glu Gly Asn Ser Ile Thr Gln Asp Trp Cys Asp
                325                 330                 335
Arg Gln Lys Val Ala Phe Gly Asp Ile Asp Asp Phe Asn Arg Lys Gly
            340                 345                 350
Gly Met Lys Gln Met Gly Lys Ala Leu Ala Gly Pro Met Val Leu Val
        355                 360                 365
Met Ser Ile Trp Asp Asp His Ala Ser Asn Met Leu Trp Leu Asp Ser
    370                 375                 380
Thr Phe Pro Val Asp Ala Ala Gly Lys Pro Gly Ala Glu Arg Gly Ala
385                 390                 395                 400
Cys Pro Thr Thr Ser Gly Val Pro Ala Glu Val Glu Ala Glu Ala Pro
                405                 410                 415
Asn Ser Asn Val Val Phe Ser Asn Ile Arg Phe Gly Pro Ile Gly Ser
            420                 425                 430
Thr Val Ala Gly Leu Pro Gly Ala Gly Asn Gly Gly Asn Asn Gly Gly
        435                 440                 445
Asn Pro Pro Pro Pro Thr Thr Thr Thr Ser Ser Ala Pro Ala Thr Thr
    450                 455                 460
Thr Thr Ala Ser Ala Gly Pro Lys Ala Gly Arg Trp Gln Gln Cys Gly
465                 470                 475                 480
Gly Ile Gly Phe Thr Gly Pro Thr Gln Cys Glu Glu Pro Tyr Thr Cys
                485                 490                 495
Thr Lys Leu Asn Asp Trp Tyr Ser Gln Cys Leu
            500                 505
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<210> 5
<211> 507
<212> PRT
<213> Humicola grisea

<400> 5

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Gln Gln Ala Cys Ser Leu Thr Thr Glu Arg His Pro Ser Leu Ser Trp
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Asn Lys Cys Thr Ala Gly Gly Gln Cys Gln Thr Val Gln Ala Ser Ile
            20                  25                  30
Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly Ser Thr
        35                  40                  45
Asn Cys Tyr Thr Gly Asn Lys Trp Asp Thr Ser Ile Cys Thr Asp Ala
    50                  55                  60
Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr Thr Ser
65                  70                  75                  80
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Thr Tyr Gly Ile Thr Thr Asn Gly Asp Ser Leu Ser Leu Lys Phe Val
                85                  90                  95
Thr Lys Gly Gln His Ser Thr Asn Val Gly Ser Arg Thr Tyr Leu Met
            100                 105                 110
Asp Gly Glu Asp Lys Tyr Gln Thr Phe Glu Leu Leu Gly Asn Glu Phe
        115                 120                 125
Thr Phe Asp Val Asp Val Ser Asn Ile Gly Cys Gly Leu Asn Gly Ala
    130                 135                 140
Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Leu Ser Arg Tyr Pro
145                 150                 155                 160
Gly Asn Lys Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ala Gln
                165                 170                 175
Cys Pro Arg Asp Ile Lys Phe Ile Asn Gly Glu Ala Asn Ile Glu Gly
            180                 185                 190
Trp Thr Gly Ser Thr Asn Asp Pro Asn Ala Gly Ala Gly Arg Tyr Gly
        195                 200                 205
Thr Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Asn Met Ala Thr
    210                 215                 220
Ala Phe Thr Pro His Pro Cys Thr Ile Ile Gly Gln Ser Arg Cys Glu
225                 230                 235                 240
Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn Glu Arg Tyr Ala Gly Val
                245                 250                 255
Cys Asp Pro Asp Gly Cys Asp Phe Asn Ser Tyr Arg Gln Gly Asn Lys
            260                 265                 270
Thr Phe Tyr Gly Lys Gly Met Thr Val Asp Thr Thr Lys Lys Ile Thr
        275                 280                 285
Val Val Thr Gln Phe Leu Lys Asp Ala Asn Gly Asp Leu Gly Glu Ile
    290                 295                 300
Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile Ile Pro Asn Ser Glu Ser
305                 310                 315                 320
Thr Ile Pro Gly Val Glu Gly Asn Ser Ile Thr Gln Asp Trp Cys Asp
                325                 330                 335
Arg Gln Lys Val Ala Phe Gly Asp Ile Asp Asp Phe Asn Arg Lys Gly
            340                 345                 350
Gly Met Lys Gln Met Gly Lys Ala Leu Ala Gly Pro Met Val Leu Val
        355                 360                 365
Met Ser Ile Trp Asp Asp His Ala Ser Asn Met Leu Trp Leu Asp Ser
    370                 375                 380
Thr Phe Pro Val Asp Ala Ala Gly Lys Pro Gly Ala Glu Arg Gly Ala
385                 390                 395                 400
Cys Pro Thr Thr Ser Gly Val Pro Ala Glu Val Glu Ala Glu Ala Pro
                405                 410                 415
Asn Ser Asn Val Val Phe Ser Asn Ile Arg Phe Gly Pro Ile Gly Ser
            420                 425                 430
Thr Val Ala Gly Leu Pro Gly Ala Gly Asn Gly Gly Asn Asn Gly Gly
        435                 440                 445
Asn Pro Pro Pro Pro Thr Thr Thr Thr Ser Ser Ala Pro Ala Thr Thr
    450                 455                 460
Thr Thr Ala Ser Ala Gly Pro Lys Ala Gly Arg Trp Gln Gln Cys Gly
465                 470                 475                 480
Gly Ile Gly Phe Thr Gly Pro Thr Gln Cys Glu Glu Pro Tyr Ile Cys
                485                 490                 495
Thr Lys Leu Asn Asp Trp Tyr Ser Gln Cys Leu
            500                 505
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<210> 6
<211> 507
<212> PRT
<213> Humicola grisea

<400> 6
Gln Gln Ala Cys Ser Leu Thr Thr Glu Arg His Pro Ser Leu Ser Trp

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            20                  25                  30
Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly Ser Thr
        35                  40                  45
Asn Cys Tyr Thr Gly Asn Lys Trp Asp Thr Ser Ile Cys Thr Asp Ala
    50                  55                  60
Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr Thr Ser
65                  70                  75                  80
Thr Tyr Gly Ile Thr Thr Asn Gly Asp Ser Leu Ser Leu Lys Phe Val
                85                  90                  95
Thr Lys Gly Gln Tyr Ser Thr Asn Val Gly Ser Arg Thr Tyr Leu Met
            100                 105                 110
Asp Gly Glu Asp Lys Tyr Gln Thr Phe Glu Leu Leu Gly Asn Glu Phe
        115                 120                 125
Thr Phe Asp Val Asp Val Ser Asn Ile Gly Cys Gly Leu Asn Gly Ala
    130                 135                 140
Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Leu Ser Arg Tyr Pro
145                 150                 155                 160
Gly Asn Lys Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ala Gln
                165                 170                 175
Cys Pro Arg Asp Ile Lys Phe Ile Asn Gly Glu Ala Asn Ile Glu Gly
            180                 185                 190
Trp Thr Gly Ser Thr Asn Asp Pro Asn Ala Gly Ala Gly Arg Tyr Gly
        195                 200                 205
Thr Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Asn Met Ala Thr
    210                 215                 220
Ala Phe Thr Pro His Pro Cys Thr Ile Ile Gly Gln Ser Arg Cys Glu
225                 230                 235                 240
Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn Glu Arg Tyr Ala Gly Val
                245                 250                 255
Cys Asp Pro Asp Gly Cys Asp Phe Asn Ser Tyr Arg Gln Gly Asn Lys
            260                 265                 270
Thr Phe Tyr Gly Lys Gly Met Thr Val Asp Thr Thr Lys Lys Ile Thr
        275                 280                 285
Val Val Thr Gln Phe Leu Lys Asp Ala Asn Gly Asp Leu Gly Glu Ile
    290                 295                 300
Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile Ile Pro Asn Ser Glu Ser
305                 310                 315                 320
Thr Ile Pro Gly Val Glu Gly Asn Ser Ile Thr Gln Asp Trp Cys Asp
                325                 330                 335
Arg Gln Lys Val Ala Phe Gly Asp Ile Asp Asp Phe Asn Arg Lys Gly
            340                 345                 350
Gly Met Lys Gln Met Gly Lys Ala Leu Ala Gly Pro Met Val Leu Val
        355                 360                 365
Met Ser Ile Trp Asp Asp His Ala Ser Asn Met Leu Trp Leu Asp Ser
    370                 375                 380
Thr Phe Pro Val Asp Ala Ala Gly Lys Pro Gly Ala Glu Arg Gly Ala
385                 390                 395                 400
Cys Pro Thr Thr Ser Gly Val Pro Ala Glu Val Glu Ala Glu Ala Pro
                405                 410                 415
Asn Ser Asn Val Val Phe Ser Asn Ile Arg Phe Gly Pro Ile Gly Ser
            420                 425                 430
Thr Val Ala Gly Leu Pro Gly Ala Gly Asn Gly Gly Asn Asn Gly Gly
        435                 440                 445
Asn Pro Pro Pro Pro Thr Thr Thr Thr Ser Ser Ala Pro Ala Thr Thr
    450                 455                 460
Thr Thr Ala Ser Ala Gly Pro Lys Ala Gly Arg Trp Gln Gln Cys Gly
465                 470                 475                 480
Gly Ile Gly Phe Thr Gly Pro Thr Gln Cys Glu Glu Pro Tyr Thr Cys
                485                 490                 495
Thr Lys Leu Asn Asp Trp Tyr Ser Gln Cys Leu
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500 505

<210> 7
<211> 1662
<212> DNA
<213> Scytalidium thermophilium

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ggccagtgcc agaccgtcca ggcttccatc actctcgact ccaactggcg ctggactcac 180
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acttgcacca agctcaacga ctggtactct cagtgcctgt aa 1662

<210> 8
<211> 1602
<212> DNA
<213> Scytalidium thermophilium

<400> 8
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ggccagtgcc agaccgtcca ggcttccatc actctcgact ccaactggcg ctggactcac 180
caggtgtctg gctccaccaa ctgctacacg ggcaacgagt gggattctag catctgcact 240
gatgccaagt cgtgcgctca gaactgctgc gtcgatggtg ctgactacac cagcacctat 300
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gagatcaagc gcttctacgt ccaggatggg aagatcatcc ccaactccga gtccaccatc 1020
cccggcgtcg agggcaactc catcacccag gattggtgcg accgccagaa ggttgccttt 1080
ggcgacattg acgacttcaa ccgcaagggc ggcatgaagc agatgggcaa ggccctcgcc 1140

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accacctcgg gtgtccctgc tgaggttgag gccgaggccc ccaacagcaa cgtcgtcttc    1320
tccaacatcc gcttcggccc catcggctcg accgttgccg gccttcccag cgatggcggc    1380
aacaacggcg gcaacaccac cgtccagccc ccgcccagca ccaccaccac ctctgccagc    1440
agcagcacca cctcggctcc tgccaccacc accaccgcca gcgctggccc caaggctggc    1500
cgctggcagc agtgcggcgg catcggcttc actggcccga cccagtgcga ggagccctac    1560
acttgcacca agctcaacga ctggtactct cagtgcctgt aa                       1602
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<210> 9
<211> 533
<212> PRT
<213> Scytalidium thermophilium

<400> 9

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Met Arg Thr Ala Lys Phe Ala Thr Leu Ala Ala Leu Val Ala Ser Ala
 1               5                  10                  15
Ala Ala Gln Gln Ala Cys Ser Leu Thr Thr Glu Arg His Pro Ser Leu
            20                  25                  30
Ser Trp Lys Lys Cys Thr Ala Gly Gly Gln Cys Gln Thr Val Gln Ala
        35                  40                  45
Ser Ile Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly
    50                  55                  60
Ser Thr Asn Cys Tyr Thr Gly Asn Glu Trp Asp Ser Ser Ile Cys Thr
65                  70                  75                  80
Asp Ala Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr
                85                  90                  95
Thr Ser Thr Tyr Gly Ile Thr Thr Asn Gly Asp Ser Leu Ser Leu Lys
            100                 105                 110
Phe Val Thr Lys Gly Gln Tyr Ser Thr Asn Val Gly Ser Arg Thr Tyr
        115                 120                 125
Leu Met Asp Gly Glu Asp Lys Tyr Gln Thr Phe Glu Leu Leu Gly Asn
    130                 135                 140
Glu Phe Thr Phe Asp Val Asp Val Ser Asn Ile Gly Cys Gly Leu Asn
145                 150                 155                 160
Gly Ala Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Leu Ser Arg
                165                 170                 175
Tyr Pro Gly Asn Lys Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp
            180                 185                 190
Ala Gln Cys Pro Arg Asp Ile Lys Phe Ile Asn Gly Glu Ala Asn Ile
        195                 200                 205
Glu Gly Trp Thr Gly Ser Thr Asn Asp Pro Asn Ala Gly Ala Gly Arg
    210                 215                 220
Tyr Gly Thr Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Asn Met
225                 230                 235                 240
Ala Thr Ala Phe Thr Pro His Pro Cys Thr Ile Ile Gly Gln Ser Arg
                245                 250                 255
Cys Glu Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn Asp Arg Tyr Ala
            260                 265                 270
Gly Val Cys Asp Pro Asp Gly Cys Asp Phe Asn Ala Tyr Arg Gln Gly
        275                 280                 285
Asn Lys Thr Phe Tyr Gly Lys Gly Met Thr Val Asp Thr Thr Lys Lys
    290                 295                 300
Leu Thr Val Val Thr Gln Phe Leu Lys Asp Ala Asn Gly Asp Leu Gly
305                 310                 315                 320
Glu Ile Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile Ile Pro Asn Ser
                325                 330                 335
Glu Ser Thr Ile Pro Gly Val Glu Gly Asn Ser Ile Thr Gln Asp Trp
            340                 345                 350
Cys Asp Arg Gln Lys Val Ala Phe Gly Asp Ile Asp Asp Phe Asn Arg
        355                 360                 365
Lys Gly Gly Met Lys Gln Met Gly Lys Ala Leu Ala Gly Pro Met Val
```

```
    370                 375                 380
Leu Val Met Ser Ile Trp Asp Asp His Ala Ser Asn Met Leu Trp Leu
385                 390                 395                 400
Asp Ser Thr Phe Pro Val Asp Ala Ala Gly Lys Pro Gly Ala Glu Arg
                405                 410                 415
Gly Ala Cys Pro Thr Thr Ser Gly Val Pro Ala Glu Val Glu Ala Glu
            420                 425                 430
Ala Pro Asn Ser Asn Val Val Phe Ser Asn Ile Arg Phe Gly Pro Ile
        435                 440                 445
Gly Ser Thr Val Ala Gly Leu Pro Ser Asp Gly Gly Asn Asn Gly Gly
    450                 455                 460
Asn Thr Thr Val Gln Pro Pro Pro Ser Thr Thr Thr Thr Ser Ala Ser
465                 470                 475                 480
Ser Ser Thr Thr Ser Ala Pro Ala Thr Thr Thr Thr Ala Ser Ala Gly
                485                 490                 495
Pro Lys Ala Gly Arg Trp Gln Gln Cys Gly Gly Ile Gly Phe Thr Gly
            500                 505                 510
Pro Thr Gln Cys Glu Glu Pro Tyr Thr Cys Thr Lys Leu Asn Asp Trp
        515                 520                 525
Tyr Ser Gln Cys Leu
    530
```

<210> 10
<211> 497
<212> PRT
<213> Hypocrea jecorina

<400> 10

```
Gln Ser Ala Cys Thr Leu Gln Ser Glu Thr His Pro Pro Leu Thr Trp
 1               5                  10                  15
Gln Lys Cys Ser Ser Gly Gly Thr Cys Thr Gln Gln Thr Gly Ser Val
            20                  25                  30
Val Ile Asp Ala Asn Trp Arg Trp Thr His Ala Thr Asn Ser Ser Thr
        35                  40                  45
Asn Cys Tyr Asp Gly Asn Thr Trp Ser Ser Thr Leu Cys Pro Asp Asn
    50                  55                  60
Glu Thr Cys Ala Lys Asn Cys Cys Leu Asp Gly Ala Ala Tyr Ala Ser
65                  70                  75                  80
Thr Tyr Gly Val Thr Thr Ser Gly Asn Ser Leu Ser Ile Gly Phe Val
                85                  90                  95
Thr Gln Ser Ala Gln Lys Asn Val Gly Ala Arg Leu Tyr Leu Met Ala
            100                 105                 110
Ser Asp Thr Thr Tyr Gln Glu Phe Thr Leu Leu Gly Asn Glu Phe Ser
        115                 120                 125
Phe Asp Val Asp Val Ser Gln Leu Pro Cys Gly Leu Asn Gly Ala Leu
    130                 135                 140
Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Val Ser Lys Tyr Pro Thr
145                 150                 155                 160
Asn Thr Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ser Gln Cys
                165                 170                 175
Pro Arg Asp Leu Lys Phe Ile Asn Gly Gln Ala Asn Val Glu Gly Trp
            180                 185                 190
Glu Pro Ser Ser Asn Asn Ala Asn Thr Gly Ile Gly Gly His Gly Ser
        195                 200                 205
Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Ser Ile Ser Glu Ala
    210                 215                 220
Leu Thr Pro His Pro Cys Thr Thr Val Gly Gln Glu Ile Cys Glu Gly
225                 230                 235                 240
Asp Gly Cys Gly Gly Thr Tyr Ser Asp Asn Arg Tyr Gly Gly Thr Cys
                245                 250                 255
Asp Pro Asp Gly Cys Asp Trp Asn Pro Tyr Arg Leu Gly Asn Thr Ser
            260                 265                 270
```

```
Phe Tyr Gly Pro Gly Ser Ser Phe Thr Leu Asp Thr Thr Lys Lys Leu
        275                 280                 285
Thr Val Val Thr Gln Phe Glu Thr Ser Gly Ala Ile Asn Arg Tyr Tyr
    290                 295                 300
Val Gln Asn Gly Val Thr Phe Gln Gln Pro Asn Ala Glu Leu Gly Ser
305                 310                 315                 320
Tyr Ser Gly Asn Glu Leu Asn Asp Asp Tyr Cys Thr Ala Glu Glu Ala
                325                 330                 335
Glu Phe Gly Gly Ser Ser Phe Ser Asp Lys Gly Gly Leu Thr Gln Phe
            340                 345                 350
Lys Lys Ala Thr Ser Gly Gly Met Val Leu Val Met Ser Leu Trp Asp
        355                 360                 365
Asp Tyr Tyr Ala Asn Met Leu Trp Leu Asp Ser Thr Tyr Pro Thr Asn
    370                 375                 380
Glu Thr Ser Ser Thr Pro Gly Ala Val Arg Gly Ser Cys Ser Thr Ser
385                 390                 395                 400
Ser Gly Val Pro Ala Gln Val Glu Ser Gln Ser Pro Asn Ala Lys Val
                405                 410                 415
Thr Phe Ser Asn Ile Lys Phe Gly Pro Ile Gly Ser Thr Gly Asn Pro
            420                 425                 430
Ser Gly Gly Asn Pro Pro Gly Gly Asn Pro Pro Gly Thr Thr Thr Thr
        435                 440                 445
Arg Arg Pro Ala Thr Thr Thr Gly Ser Ser Pro Gly Pro Thr Gln Ser
    450                 455                 460
His Tyr Gly Gln Cys Gly Gly Ile Gly Tyr Ser Gly Pro Thr Val Cys
465                 470                 475                 480
Ala Ser Gly Thr Thr Cys Gln Val Leu Asn Pro Tyr Tyr Ser Gln Cys
                485                 490                 495
Leu
```

<210> 11
<211> 515
<212> PRT
<213> Scytalidium thermophilium

<400> 11

```
Gln Gln Ala Cys Ser Leu Thr Thr Glu Arg His Pro Ser Leu Ser Trp
 1               5                  10                  15
Lys Lys Cys Thr Ala Gly Gly Gln Cys Gln Thr Val Gln Ala Ser Ile
            20                  25                  30
Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly Ser Thr
        35                  40                  45
Asn Cys Tyr Thr Gly Asn Glu Trp Asp Ser Ser Ile Cys Thr Asp Ala
    50                  55                  60
Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr Thr Ser
65                  70                  75                  80
Thr Tyr Gly Ile Thr Thr Asn Gly Asp Ser Leu Ser Leu Lys Phe Val
                85                  90                  95
Thr Lys Gly Gln Tyr Ser Thr Asn Val Gly Ser Arg Thr Tyr Leu Met
            100                 105                 110
Asp Gly Glu Asp Lys Tyr Gln Thr Phe Glu Leu Leu Gly Asn Glu Phe
        115                 120                 125
Thr Phe Asp Val Asp Val Ser Asn Ile Gly Cys Gly Leu Asn Gly Ala
    130                 135                 140
Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Leu Ser Arg Tyr Pro
145                 150                 155                 160
Gly Asn Lys Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ala Gln
                165                 170                 175
Cys Pro Arg Asp Ile Lys Phe Ile Asn Gly Glu Ala Asn Ile Glu Gly
            180                 185                 190
Trp Thr Gly Ser Thr Asn Asp Pro Asn Ala Gly Ala Gly Arg Tyr Gly
```

```
        195                 200                 205
Thr Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Asn Met Ala Thr
    210                 215                 220
Ala Phe Thr Pro His Pro Cys Thr Ile Ile Gly Gln Ser Arg Cys Glu
225                 230                 235                 240
Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn Asp Arg Tyr Ala Gly Val
                245                 250                 255
Cys Asp Pro Asp Gly Cys Asp Phe Asn Ala Tyr Arg Gln Gly Asn Lys
            260                 265                 270
Thr Phe Tyr Gly Lys Gly Met Thr Val Asp Thr Thr Lys Lys Leu Thr
        275                 280                 285
Val Val Thr Gln Phe Leu Lys Asp Ala Asn Gly Asp Leu Gly Glu Ile
    290                 295                 300
Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile Ile Pro Asn Ser Glu Ser
305                 310                 315                 320
Thr Ile Pro Gly Val Glu Gly Asn Ser Ile Thr Gln Asp Trp Cys Asp
                325                 330                 335
Arg Gln Lys Val Ala Phe Gly Asp Ile Asp Asp Phe Asn Arg Lys Gly
            340                 345                 350
Gly Met Lys Gln Met Gly Lys Ala Leu Ala Gly Pro Met Val Leu Val
        355                 360                 365
Met Ser Ile Trp Asp Asp His Ala Ser Asn Met Leu Trp Leu Asp Ser
    370                 375                 380
Thr Phe Pro Val Asp Ala Ala Gly Lys Pro Gly Ala Glu Arg Gly Ala
385                 390                 395                 400
Cys Pro Thr Thr Ser Gly Val Pro Ala Glu Val Glu Ala Glu Ala Pro
                405                 410                 415
Asn Ser Asn Val Val Phe Ser Asn Ile Arg Phe Gly Pro Ile Gly Ser
            420                 425                 430
Thr Val Ala Gly Leu Pro Ser Asp Gly Gly Asn Asn Gly Gly Asn Thr
        435                 440                 445
Thr Val Gln Pro Pro Pro Ser Thr Thr Thr Thr Ser Ala Ser Ser Ser
    450                 455                 460
Thr Thr Ser Ala Pro Ala Thr Thr Thr Thr Ala Ser Ala Gly Pro Lys
465                 470                 475                 480
Ala Gly Arg Trp Gln Gln Cys Gly Gly Ile Gly Phe Thr Gly Pro Thr
                485                 490                 495
Gln Cys Glu Glu Pro Tyr Thr Cys Thr Lys Leu Asn Asp Trp Tyr Ser
            500                 505                 510
Gln Cys Leu
        515
```

<210> 12
<211> 507
<212> PRT
<213> Artificial Sequence

<220>
<223> consensus sequence

<400> 12

```
Gln Gln Ala Cys Ser Leu Thr Thr Glu Arg His Pro Ser Leu Ser Trp
 1               5                  10                  15
Lys Lys Cys Thr Ala Gly Gly Gln Cys Gln Thr Val Gln Ala Ser Ile
            20                  25                  30
Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly Ser Thr
        35                  40                  45
Asn Cys Tyr Thr Gly Asn Lys Trp Asp Ser Ser Ile Cys Thr Asp Ala
    50                  55                  60
Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr Thr Ser
65                  70                  75                  80
Thr Tyr Gly Ile Thr Thr Asn Gly Asp Ser Leu Ser Leu Lys Phe Val
```

```
                85                  90                  95
Thr Lys Gly Gln His Ser Thr Asn Val Gly Ser Arg Thr Tyr Leu Met
            100                 105                 110
Asp Gly Glu Asp Lys Tyr Gln Thr Phe Glu Leu Leu Gly Asn Glu Phe
        115                 120                 125
Thr Phe Asp Val Asp Val Ser Asn Ile Gly Cys Gly Leu Asn Gly Ala
    130                 135                 140
Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Leu Ser Arg Tyr Pro
145                 150                 155                 160
Gly Asn Lys Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ala Gln
                165                 170                 175
Cys Pro Arg Asp Ile Lys Phe Ile Asn Gly Glu Ala Asn Ile Glu Gly
            180                 185                 190
Trp Thr Gly Ser Thr Asn Asp Pro Asn Ala Gly Ala Gly Arg Tyr Gly
        195                 200                 205
Thr Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Asn Met Ala Thr
    210                 215                 220
Ala Phe Thr Pro His Pro Cys Thr Ile Ile Gly Gln Ser Arg Cys Glu
225                 230                 235                 240
Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn Glu Arg Tyr Ala Gly Val
                245                 250                 255
Cys Asp Pro Asp Gly Cys Asp Phe Asn Ser Tyr Arg Gln Gly Asn Lys
            260                 265                 270
Thr Phe Tyr Gly Lys Gly Met Thr Val Asp Thr Thr Lys Lys Ile Thr
        275                 280                 285
Val Val Thr Gln Phe Leu Lys Asp Ala Asn Gly Asp Leu Gly Glu Ile
    290                 295                 300
Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile Ile Pro Asn Ser Glu Ser
305                 310                 315                 320
Thr Ile Pro Gly Val Glu Gly Asn Ser Ile Thr Gln Asp Trp Cys Asp
                325                 330                 335
Arg Gln Lys Val Ala Phe Gly Asp Ile Asp Asp Phe Asn Arg Lys Gly
            340                 345                 350
Gly Met Lys Gln Met Gly Lys Ala Leu Ala Gly Pro Met Val Leu Val
        355                 360                 365
Met Ser Ile Trp Asp Asp His Ala Ser Asn Met Leu Trp Leu Asp Ser
    370                 375                 380
Thr Phe Pro Val Asp Ala Ala Gly Lys Pro Gly Ala Glu Arg Gly Ala
385                 390                 395                 400
Cys Pro Thr Thr Ser Gly Val Pro Ala Glu Val Glu Ala Glu Ala Pro
                405                 410                 415
Asn Ser Asn Val Val Phe Ser Asn Ile Arg Phe Gly Pro Ile Gly Ser
            420                 425                 430
Thr Val Ala Gly Leu Pro Gly Ala Gly Asn Gly Gly Asn Asn Gly Gly
        435                 440                 445
Asn Pro Pro Pro Pro Thr Thr Thr Thr Ser Ser Ala Pro Ala Thr Thr
    450                 455                 460
Thr Thr Ala Ser Ala Gly Pro Lys Ala Gly Arg Trp Gln Gln Cys Gly
465                 470                 475                 480
Gly Ile Gly Phe Thr Gly Pro Thr Gln Cys Glu Glu Pro Tyr Thr Cys
                485                 490                 495
Thr Lys Leu Asn Asp Trp Tyr Ser Gln Cys Leu
            500                 505
```

<210> 13
<211> 507
<212> PRT
<213> Artificial Sequence

<220>
<223> consensus sequence

<400> 13

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Gln Gln Ala Cys Ser Leu Thr Thr Glu Arg His Pro Ser Leu Ser Trp
 1               5                  10                  15
Lys Lys Cys Thr Ala Gly Gly Gln Cys Gln Thr Val Gln Ala Ser Ile
            20                  25                  30
Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly Ser Thr
        35                  40                  45
Asn Cys Tyr Thr Gly Asn Lys Trp Asp Thr Ser Ile Cys Thr Asp Ala
    50                  55                  60
Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr Thr Ser
65                  70                  75                  80
Thr Tyr Gly Ile Thr Thr Asn Gly Asp Ser Leu Ser Leu Lys Phe Val
                85                  90                  95
Thr Lys Gly Gln His Ser Thr Asn Val Gly Ser Arg Thr Tyr Leu Met
            100                 105                 110
Asp Gly Glu Asp Lys Tyr Gln Thr Phe Glu Leu Leu Gly Asn Glu Phe
        115                 120                 125
Thr Phe Asp Val Asp Val Ser Asn Ile Gly Cys Gly Leu Asn Gly Ala
    130                 135                 140
Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Leu Ser Arg Tyr Pro
145                 150                 155                 160
Gly Asn Lys Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ala Gln
                165                 170                 175
Cys Pro Arg Asp Ile Lys Phe Ile Asn Gly Glu Ala Asn Ile Glu Gly
            180                 185                 190
Trp Thr Gly Ser Thr Asn Asp Pro Asn Ala Gly Ala Gly Arg Tyr Gly
        195                 200                 205
Thr Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Asn Met Ala Thr
    210                 215                 220
Ala Phe Thr Pro His Pro Cys Thr Ile Ile Gly Gln Ser Arg Cys Glu
225                 230                 235                 240
Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn Glu Arg Tyr Ala Gly Val
                245                 250                 255
Cys Asp Pro Asp Gly Cys Asp Phe Asn Ser Tyr Arg Gln Gly Asn Lys
            260                 265                 270
Thr Phe Tyr Gly Lys Gly Met Thr Val Asp Thr Thr Lys Lys Ile Thr
        275                 280                 285
Val Val Thr Gln Phe Leu Lys Asp Ala Asn Gly Asp Leu Gly Glu Ile
    290                 295                 300
Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile Ile Pro Asn Ser Glu Ser
305                 310                 315                 320
Thr Ile Pro Gly Val Glu Gly Asn Ser Ile Thr Gln Asp Trp Cys Asp
                325                 330                 335
Arg Gln Lys Val Ala Phe Gly Asp Ile Asp Asp Phe Asn Arg Lys Gly
            340                 345                 350
Gly Met Lys Gln Met Gly Lys Ala Leu Ala Gly Pro Met Val Leu Val
        355                 360                 365
Met Ser Ile Trp Asp Asp His Ala Ser Asn Met Leu Trp Leu Asp Ser
    370                 375                 380
Thr Phe Pro Val Asp Ala Ala Gly Lys Pro Gly Ala Glu Arg Gly Ala
385                 390                 395                 400
Cys Pro Thr Thr Ser Gly Val Pro Ala Glu Val Glu Ala Glu Ala Pro
                405                 410                 415
Asn Ser Asn Val Val Phe Ser Asn Ile Arg Phe Gly Pro Ile Gly Ser
            420                 425                 430
Thr Val Ala Gly Leu Pro Gly Ala Gly Asn Gly Gly Asn Asn Gly Gly
        435                 440                 445
Asn Pro Pro Pro Pro Thr Thr Thr Thr Ser Ser Ala Pro Ala Thr Thr
    450                 455                 460
Thr Thr Ala Ser Ala Gly Pro Lys Ala Gly Arg Trp Gln Gln Cys Gly
465                 470                 475                 480
Gly Ile Gly Phe Thr Gly Pro Thr Gln Cys Glu Glu Pro Tyr Thr Cys
```

485 490 495

Thr Lys Leu Asn Asp Trp Tyr Ser Gln Cys Leu
500 505

<210> 14
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 14
atgcgtaccg ccaagttcgc 20

<210> 15
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 15
ttacaggcac tgagagtacc ag 22